Model 8732
IAQ-CALC™
Indoor Air Quality Meter

Operation and Service Manual

1980393, Revision D
October 2004

TSI®

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Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI's Customer Service department at (800) 861-7513 (USA) and (001 651) 490-2889 (International).

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To obtain Application Notes or technical support contact TSI at the following:

U.S. (800) 861-7513 / (651) 490-2889
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International: (1) 651-490-2889
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Unpacking and Parts Identification

Carefully unpack the instrument and accessories from the shipping container. Check the individual parts against the list of components in Table 1-1. If any are missing or damaged, notify TSI or your local distributor immediately.

Table 1-1: List of components

Qty	Item	Part #
1	IAQ-CALC Model 8732	8732
1	Carrying case	1319251
4	AA alkaline batteries	1208013
1	Operation and service manual	1980393

Optional Accessories

The following contains information for optional accessories for the IAQ-CALC (see Figure 1-1 and Table 1-2).

Figure 1-1: Model 8928 Portable Printer Kit

Ref	Qty	Item Description	Part/ Model
1	1	RJ45 to 9-pin Printer Cable	8926
2	1	Model 8928 portable printer	8928
3	1	AC adapter/charger for printer	2613049
4	1	User Guide	8928
5	5	Thermal paper (roll)	80211

Table 1-2: Optional AC Adapter

Qty	Item Description	Part/ Model
1	Optional AC Adapter	
	115 V, NEMA-5	2613033
	230 V, European CEE 7/16	2613078
	230 V, Great Britain	800169
	240 V, Australian	2613106

Chapter 2

Setting Up

Supplying Power to the IAQ-CALC

The IAQ-CALC can be powered in one of two ways: four size AA batteries or the optional AC adapter.

Installing the Batteries

Insert four AA batteries as indicated by the diagram located on the inside of the battery compartment. TSI ships the unit with alkaline batteries. The IAQ-CALC is designed to operate with alkaline batteries. Other battery types are not recommended. At 15% battery life remaining, the battery indicator will blink, indicating the batteries need to be changed. At 0% "LO" will display, and the instrument will shut off within 10 seconds.

Using the Optional AC Adapter

The optional AC adapter allows you to power the IAQ-CALC from a wall outlet. When using the AC adapter, the batteries (if installed) will be bypassed. The AC adapter is not a battery charger.

Connecting the Optional Model 8928 Portable Printer

To connect the Model 8928 printer to the IAQ-CALC meter, do the following:

1. Ensure that the IAQ-CALC and printer are off.
2. Locate the printer interface cable and connect the 9-pin end labeled **PRINTER** to the printer and the other end to the communications port on the IAQ-CALC monitor.
3. Turn on the IAQ-CALC; *then* turn on the printer.

***Note**: Always turn on the IAQ-CALC before turning on the printer. If the printer prints question marks (??????), asterisks (******), or random characters, reset it by turning it off and then on again. If necessary, refer to the Model 8928 Portable Printer Operation and Service Manual.*

Chapter 3

Operation

Keypad Functions

When pressing the keys on the front panel, the IAQ-CALC will beep to confirm the function. If you press a key and the IAQ-CALC does not beep, then the IAQ-CALC does not allow that function during the selected mode.

ON/OFF Key

Press the ON/OFF key to turn the IAQ-CALC on and off. When the instrument is first turned on, it goes through a preprogrammed power-up sequence that includes an internal self-check (when all displayable items are shown). The IAQ-CALC also displays percentage of battery life and then, after a brief warm up period, starts measuring CO_2 in real-time.

SAMPLE Key

Press and release the SAMPLE key to start the sample. Press the SAMPLE key again to stop taking a sample. The number of seconds sampled will be displayed followed by the average ('AVG') and then the IAQ-CALC will return to measuring in real-time. The minimum sample time is 5 seconds.

If the instrument is hooked up to a printer, then the average and 'Number of Data' (Number of Seconds) will print.

Calibration Mode

1. Turn the IAQ-CALC off and flip DIP switch #7 to ON.
2. Turn the IAQ-CALC on. It will flash "CAL" on the top row and beep intermittently until you are done with the procedure and back in "Normal" mode.
3. Press and hold the SAMPLE key to begin the calibration procedure. The display will begin a countdown from 5 to 0. Release the key when the display reads 0. If the key is released too soon or too late, the instrument will go back to beeping and flashing "CAL". If you've done this step correctly, 'ZErO' will appear on the display and the beeping will have stopped.
4. Install the regulator on the zero calibration gas tank and connect tubing from the regulator to the inlet fitting on the back of the IAQ-CALC.
5. Turn on gas flow.
6. Press and release the SAMPLE key to begin a zero reading. The IAQ-CALC begins a 60 second countdown during the

zero reading. The actual zero reading is taken in the last 10 seconds. When the countdown is completed, the display indicates 'SPAN' and the span concentration.

7. Install the regulator on the span calibration cylinder and connect tubing from the regulator to the inlet fitting on the back of the IAQ-CALC.
8. Use ▲ and ▼ to adjust the concentration displayed on the IAQ-CALC to match the concentration on the span gas cylinder.
9. Press and release the SAMPLE key to take a span gas reading. The IAQ-CALC starts a 60 second countdown. When the countdown reaches zero, the instrument returns to the normal measurement mode.
10. With the gas still connected, observe the reading on the display. It should indicate the span gas concentration. If not, repeat the calibration.
11. If the displayed reading is accurate, remove the regulator and tubing.
12. Turn the IAQ-CALC off and flip DIP switch #7 to OFF (normal mode). The calibration is now complete.

PRINT (▲) Key

Press the PRINT key at any time to print out the values shown on the display. Pressing and holding the PRINT key will print CO_2 concentrations every second.

The ▲ key is also used in calibration mode for adjusting the span value. See "Calibration Mode" under the *SAMPLE key* section for more detail.

STATISTICS (▼) Key

Press the STATISTICS key to view seconds sampled and average ('AVG').

Press the STATISTICS key repeatedly to toggle through the minimum, maximum and average values for the most recently taken sample. If a printer is attached, the average, maximum and minimum will print out as they are displayed.

The ▼ key is also used in calibration mode for adjusting the span value. See "Calibration Mode" in the *SAMPLE key* section for more detail.

Maintenance

The IAQ-CALC requires very little maintenance to keep it performing well.

Sensor Probe

Periodically inspect the probe to ensure that it is clean. Dust and oil deposits on the sensor probe may affect the response time of the IAQ-CALC. To remove dust, blow it off with a gentle stream of air.

CO_2 Sensor

TSI recommends calibrating the IAQ-CALC monitor CO_2 measurement monthly to help ensure accurate readings.

Case

If the instrument case needs cleaning, wipe it off with a soft cloth and isopropyl alcohol or a mild detergent. Never submerge the IAQ-CALC.

Storage

When storing the IAQ-CALC for more than a month, remove the batteries to prevent damage due to potential battery leakage.

Service

To maintain a high degree of accuracy in your measurements, return your instrument to TSI for annual calibration. For a nominal fee, we will recalibrate the unit and return it to you with a NIST traceable certificate of calibration. This ‘annual checkup’ assures you of consistently accurate readings; it is especially important in applications where strict calibration records must be maintained.

Chapter 5

Troubleshooting

Table 5-1 lists symptoms, possible causes, and recommended solutions for common problems encountered with the IAQ-CALC. If your symptom is not listed, or none of the solutions solves your problem, please contact TSI.

Table 5-1: Troubleshooting the IAQ-CALC Meter

Symptom	Possible Causes	Corrective Actions
No display	Instrument not on	Switch on the instrument
	Low batteries	Replace the batteries
	Dirty battery contacts	Clean the battery contacts
	Batteries installed incorrectly	Refer to battery illustration inside battery cover
BAT is blinking	Dirty battery contacts	Clean contacts and batteries
	Low battery	Replace the batteries
SPAn err or ZERO err	Error in field calibration	Perform calibration again
Display reads “LO”	Batteries are low	Replace the batteries

Appendix A

Specifications

Specifications are subject to change without notice. Specifications in parentheses () indicate metric equivalents.

CO_2:

Sensor type:	Dual wavelength detector with Non-dispersive infrared (NDIR)
Range:	0 to 5000 ppm
Accuracy[1]:	±3% of reading or ± 50 ppm whichever is greater at 25ºC (add ±0.36% of reading per ºC away from calibration temperature, ±0.2% of reading per ºF)
Resolution:	1 ppm
Response time:	<10 minutes in still air

TEMPERATURE RANGE:

Operating:	41 to 158°F (5 to 70°C)
Storage:	-4 to 158°F (-20 to 70°C)

EXTERNAL METER DIMENSIONS:

Size Measurements:

4.2 in. × 7.2 in. × 1.5 in.
(107 mm × 183 mm × 38 mm)

DISPLAY:

Type:	Digital
Description:	2 lines with 4 digits, 0.4 inches (10 mm) high

POWER REQUIREMENTS:

Four (4) AA-size, alkaline batteries (provided)

BATTERY LIFE:

Minimum 10 hours using alkaline batteries

STANDARD EQUIPMENT:

Free NIST* traceable certificate, operation and service manual, four AA-size alkaline batteries and a soft carrying case.

* U.S. National Institute of Standards and Technology

[1] Accuracy is based on barometric pressure of 406.8 inches H_2O (101.4 kPa). To correct for conditions, refer to Application Note TI-133.

Appendix B

Internal Dip Switch Settings

To access the DIP switches, remove the batteries from the battery compartment. On the inside of the battery compartment, there is a window with eight DIP switches. The table below shows the functions for each switch.

Caution: Make certain that power is turned off before changing DIP switch settings.

Switch	OFF	ON
1-3	Must be OFF	-----
4-5	N/A	N/A
6	Beep OFF	Beep ON
7	Normal mode	Field Calibration mode
8	N/A	N/A

- The ON position is away from the batteries and OFF is towards the batteries.
- Switch 1 is towards the display and switch 8 is nearest to the data port.

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